

expanded to a subquadrate outline. The width exceeds the length. The four abdominal segments are subequal in length.

The appendages conform in the main to those of the female. The usual dimorphism characteristic of the lichomolgids is exhibited in the transformation of the maxilliped into a prehensile structure (Fig. 1, *n*), in the presence of sixth legs, and in the segmentation of the urosome. A further manifestation of dimorphism is seen in the alteration of the terminal segment of the first endopodite. In the female this segment bears a short lateral spine and five well-developed, plumose setae (Fig. 1, *g*). The male condition is the result of the suppression of the most lateral of the setae (Fig. 1, *m*). Here there are only four normally developed setae. The shape of the entire segment is altered somewhat and at the point which would normally support the fifth seta there are several spinose projections of the integument among which stands a short, slender wisp, which may represent an extreme reduction of the seta found in the female. A similar tendency to dimorphism in the swimming legs occurs in other lichomolgids and may offer a prospect of convenient specific differentiation in some cases.

Remarks.—The host of the present species, a marine polyclad (possibly more than one species), is an addition to the diverse roster of hosts of the genus. Previously recorded associates have been annelids, mollusks, echinoids, and a nemertean. Many of the records of the occurrence of species of the genus have been based on planktonic samplings. Continued free existence of these individuals would be most unlikely in view of the extreme specialization of the mouthparts

which are unsuited to the capture of any motile organism and probably incapable even of seizure of free-floating particles. A varying degree of tenacity in adhering to the host on the part of these copepods must explain the relatively large number of species for which no host record has yet been established. In the present instance most specimens so far found have shown a marked inclination to adhere to the surface of the worm and many have so remained after hours of tumbling about in the diverse lot of materials obtained from several dredge hauls.

The specific differentiation of *Pseudanthessius latus* is readily established on characters consistent in both sexes. The fourth endopodite is highly distinctive, as is the elongation of the second antennular segment and both features are readily determinable under a low degree of microscopic magnification.

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MAMMALOGY.—*Notes on microtine rodents from the Brooks Range, Arctic Alaska.*¹

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In connection with parasitological studies carried on during 1949 for the U. S. Public Health Service, the writer collected a considerable number of mammals from the northern edge of the "Endicott" section of the Brooks Range, in Arctic Alaska. The mammalian fauna of this region is poorly known, since apparently no previous collecting has been done here. About 200 microtine rodents were collected, mostly near Tolugak

Lake (lat. 68° 24' N., long. 151° 26' W.), near the head of the Anaktuvuk River Valley. A few specimens were also taken at Umiat, on the Colville River, about 80 miles north of Tolugak Lake (lat. 69° 23' N., long. 152° 10' W.). Five species are represented. More complete details concerning their ecology and reproduction will be presented in a later paper, at which time the other mammals obtained will also be considered. The specimens have been deposited in the U. S. National Museum.

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Clethrionomys rutilus dawsoni (Merriam)

Red-backed voles were collected at the northern edge of the Brooks Range, at altitudes from 2,000 to 3,500 feet, and at Umiat, at the edge of the Arctic Coastal Plain, at altitudes from 300 to 500 feet.

In connection with the identification of the species of Brooks Range *Clethrionomys*, it seemed advisable to study all available material in order to reach some conclusion as to the actual species involved. The rather extensive material from both Eurasia and North America in the collections of the U. S. National Museum was utilized in making this study, with the conclusion that the Nearctic *C. dawsoni* (Merriam) is conspecific with the Palearctic *C. rutilus* Pallas.

A series of more than 20 specimens of *Clethrionomys* was obtained near Tolugak Lake, and 5 others were collected at Umiat. In addition, 24 specimens from northern Alaska, in the U. S. National Museum collection, were compared in detail with Eurasian material. Of the latter, 92 specimens of *C. rutilus jochelsoni* Allen were studied, along with smaller series of *C. rutilus rutilus* Pallas, *C. rutilus russatus* Radde, and *C. rutilus hintoni* Vinogradov. The distribution of the Siberian species of *Clethrionomys* was shown by Bobrinskoy, Kuznetsov, and Kuzyakin (1944, map no. 55). *Clethrionomys r. jochelsoni*, described from Verkhne Kolymsk, Kolyma River, northeastern Siberia, is the form most closely related to that found in Alaska.

The Alaskan specimens were closely compared with the large series of *C. rutilus jochelsoni* and were found to be very similar. Cranially, the Alaskan material shows a slightly heavier and longer rostrum, although this character is somewhat variable in both series. The nasal bones are longer in the Alaskan material. Some of the Alaskan specimens show a slightly greater arching of the cranium than is seen in the Siberian specimens. The zygomata are variable in both series; some show an anterior narrowing, some a posterior narrowing, and in some the zygomatic width is the same throughout. The molar pattern, though somewhat variable, is very nearly

identical in the two series. A summary of cranial measurements is given in Table 1.

Externally the Alaskan specimens from Tolugak Lake are hardly distinguishable from specimens from northern Siberia (Kolyma River). The Tolugak Lake specimens show a dark-rufous dorsal color, which becomes lighter and more tawny on the sides. The sides show a rather olive tinge during the spring and summer but become much more tawny and the dorsal color becomes brighter in the winter pelage, when fewer interspersed dark hairs are present. Ventrally the Alaskan specimens range from grayish to buffy. In winter pelage the tail is very hairy and is rufous above and buffy below. The specimens from Tolugak Lake and Umiat are considerably darker in color than those from farther south in Alaska (Chignik, on the Alaskan Peninsula, and Charlie Creek, near the Alaska-Yukon boundary). The specimens from the southern localities show a more yellowish cast throughout, and in dorsal coloration the Chignik specimens are indistinguishable from specimens of *C. r. jochelsoni* from the Lesser Annui River, Siberia. The latter are more yellowish below, however. Certain of the Siberian specimens of *C. r. jochelsoni*, from Nijni Kolimsk, show less dorsal rufous coloring.

A small series of specimens of *C. r. rutilus* from Tandy, oriental Siberia, is very similar to the northern Alaskan specimens, having also grayish underparts. Specimens from Lappmark, Sweden, show more tawny coloration, being very similar to the Alaskan specimens from Chignik. The animals from Dapucha, in the Altai, central Siberia, show a tendency toward grayness when compared with northern Siberian and with Alaskan specimens.

C. rutilus hintoni, from the Eimanachi River, Greater Kham Mountains, northern Manchuria, shows a general paleness of color when compared with northern Siberian and Alaskan specimens. There is less tendency toward tawinness, and the underparts are whitish without any buffy tinge.

It has long been recognized that the north Alaskan species of *Clethrionomys* (*C. dawsoni* auct.) is very closely related to the Palearctic *C. rutilus*. Bailey (1897), speaking of the genus *Evotomys* (= *Clethrionomys*), stated: "The only circumpolar species is the Arctic *E. rutilus*, which does not undergo any considerable change throughout the circumference of the Arctic Zone," and further, that "boreal species are far more stable and persistent than those inhabiting

warmer countries. In view of this fact, it is not surprising that the circumpolar *E. rutilus* presents but one phase throughout its entire range (specimens from Scandinavia, Siberia, and Arctic America being practically indistinguishable)." Zimmermann (1942), in regard to *C. rutilus*, stated that "Unter den europäischen kleinsäugern ist *M. oeconomus* nicht der einzige, der zur Zeit mit Unrecht als palaarktisch gilt. Soweit ich aus eigener Anschauung sehe, haben die Rötelmäuse (*Cl. rutilus*, vielleicht auch *glareolus*), . . . ebenso ihre amerikanischen Unterarten, nur sind diese Zusammenhänge zur Zeit durch nomenklatorische Schwierigkeiten verschleiert." Recent American workers have considered *C. dawsoni* to be specifically distinct from *C. rutilus*. In his study of the *C. dawsoni* group, Orr (1945, p. 69) pointed out the similarities of the two forms, but his material was apparently inadequate to allow the comparisons necessary to better understand the relationships involved.

In the opinion of the writer, there is no further justification to consider *Clethrionomys dawsoni* as having full specific rank, since all differences from *C. rutilus* are so slight as to be subspecific in nature. The American races should stand as follows:

- Clethrionomys rutilus dawsoni* (Merriam)
- Clethrionomys rutilus glacialis* Orr
- Clethrionomys rutilus insularis* (Heller)
- Clethrionomys rutilus orca* (Merriam)
- Clethrionomys rutilus watsoni* Orr

***Microtus oeconomus macfarlanei* Merriam**

Tundra voles were trapped rather commonly in certain habitats, usually in wet tundra areas, at altitudes up to 2,000 feet. They were never so abundant, where observations were made, as was *Microtus miurus*. *Microtus oeconomus macfarlanei* was collected both at Tolugak Lake and at Umiat; it probably occurs in all suitable habitat in this region. In general, the summer specimens were darker in color than is considered typical for this subspecies. Two subadult specimens, collected during early June, showed a peculiar buffy color dorsally—apparently a characteristic of the winter pelage, since molting was in evidence. They were cranially identical with the present species. A total of more than 30 specimens was obtained.

According to the work of Zimmermann (1942), with which the writer agrees after having examined pertinent material, the Alaskan *Microtus operarius* is conspecific with *M. oeconomus* of Eurasia. Gilmore (1946) regarded *M. operarius*

as conspecific with *M. kamtschaticus* of Siberia; however, according to Zimmermann, *kamtschaticus* is a subspecies of *M. oeconomus*. Several subspecies were previously assigned to the Alaskan *M. operarius*; of these, according to Anderson (1937), *M. operarius endoeccus* is identical with *M. o. macfarlanei*, the latter name having priority. With this one change, Zimmermann's classification of the *Microtus oeconomus* group of Alaskan voles is as follows:

- Microtus oeconomus operarius* Nelson
- Microtus oeconomus macfarlanei* Merriam (syn. *endoeccus* Osgood)
- Microtus oeconomus yakutatensis* Merriam
- Microtus oeconomus kadiacensis* Merriam
- Microtus oeconomus unalascensis* Merriam
- Microtus oeconomus popofensis* Merriam
- Microtus oeconomus sitkensis* Merriam
- Microtus oeconomus innuitus* Merriam
- Microtus oeconomus punukensis* Hall and Gilmore
- Microtus oeconomus elymocetes* Osgood

***Microtus miurus paneaki*, n. subsp.**

Voies of the subgenus *Stenocranius*, apparently representing a new subspecies of *Microtus miurus*, occurred very commonly near Tolugak Lake, and also were collected at Umiat.

Type.—Skin and skull, young adult male, U. S. N. M. no. 290296; collected at Tolugak Lake (lat. 68° 24' N., long. 152° 10' W.), Brooks Range, Alaska, June 2, 1949, by Robert Rausch, original no. 21.

Range.—Type locality and vicinity; also taken at Umiat, on the Colville River.

Diagnosis.—Size medium. Five adult males measured: Total length 151 (140–170); tail 26 (23–30); hind foot 20 (19–21) mm. Five adult females measured: Total length 151 (146–155); tail 25 (22–29); hind foot 20 (20–21) mm. The males averaged 39.2 (32.3–46.1) grams in weight; the females (all pregnant) averaged 40.9 (32.2–51.2) grams. Dorsal ground color between Ochraceous-Tawny and Yellow-Ocher (capitalized terms are from Ridgway, *Color standards and color nomenclature*, 1912). Purest color on rump and flanks. Entire dorsal surface with heavy admixture of dark brown to black hairs, resulting in general grayish appearance. Ear patches ochraceous-buff, similar to rump. Sides tawny, shading into grayish on underparts and into ochraceous-buff on flanks. Some specimens more buffy on underparts. Dorsal surface of tail ochraceous-buff, with pale buff underneath. Feet gray. Skull long and narrow as typical of subgenus. Molar pattern as typical for species.

TABLE 1.—CRANIAL MEASUREMENTS (AVERAGE) OF VARIOUS SUBSPECIES OF CLETHRIONOMYS RUTILUS

Subspecies and locality	Number examined	Sex	Length of tooth row	Condylol-basal length	Zygomat-ic width	Inter-orbital width	Mastoid width	Length of nasals
<i>Clethrionomys r. rutilus</i> :								
Lappmark.....	8	?	4.6	23.5	12.9	3.9	11.1	6.8
Siberia.....	9	♂	4.5	22.7	13.1	3.7	11.1	6.9
<i>Clethrionomys r. jochelsoni</i> :								
Northern Siberia.....	29	♀	4.6	22.7	12.9	3.7	11.1	6.7
Do.....	28	♂	4.6	22.7	12.8	3.7	11.0	6.6
<i>Clethrionomys r. dawsoni</i> :								
Tolugak Lake, Alaska.....	6	♀	5.1	23.4	13.0	3.9	11.1	7.2
Do.....	6	♂	5.1	23.6	13.0	4.0	11.4	7.3
Chignik and Charlie Creek, Alaska.....	14	♀	4.9	23.7	13.3	3.9	11.4	6.9
Do.....	10	♂	4.9	23.6	13.3	3.8	11.4	7.4

Comparisons.—*Microtus miurus paneaki* is differentiated from *M. miurus oreas* Osgood by more grayish color, strongly contrasting lateral streaks, and less over-all ochraceous coloring. The skull of *paneaki* averages larger than that of *oreas* and is slightly narrower cranially. The molar patterns are identical. From *M. miurus miurus* Osgood, *paneaki* differs in more grayish color, presence of a contrasting ochraceous flank streak, larger and more massive skull, longer and heavier rostrum, larger and more inflated bullae, and much heavier molars. Compared with the type specimen of *Microtus muriei* Nelson, the present form differs in much heavier and broader skull, wider zygomata, more inflated bullae, and more widely separated tooth rows. The molars are much heavier, and the interorbital depression is slighter in both immature and adult specimens. Two other obviously related species, *Microtus andersoni* Rand, 1945, and *M. cantator* Anderson, 1946, are both smaller than *M. miurus paneaki* and differ cranially and externally. Specimens of *andersoni* and *cantator* in the Collection of the National Museum of Canada have been examined by the writer.

More than a hundred voles of this species were collected near Tolugak Lake; they were very abundant in this vicinity during the summer of 1949. They were taken at altitudes from about 2,000 feet to above 3,000 feet. Their runways were numerous on the dry mountain slopes, often where vegetation was scarce.

This vole is named for my friend Paneak, one of the native Inland People, whose generous cooperation has contributed much to the success of the field work in the Brooks Range.

Lemmus trimucronatus alascensis Merriam

Although not so abundant as along the Arctic

coast during 1949, the brown lemming was not uncommon at Tolugak Lake during September; about 15 specimens were taken during this time. Only a single specimen was captured there previously. An immature specimen was captured at Umiat, and the skull of an adult was taken from the stomach of a rough-legged hawk (*Buteo lagopus*), which was nesting on the bluffs of the Colville River near Umiat.

Dicrostonyx groenlandicus rubricatus
(Richardson)

Only six specimens of this lemming were collected in the Brooks Mountains during 1949, and none was observed at Umiat. Additional observations would indicate that this species was generally uncommon during 1949 over the whole of the Arctic Slope. About 15 specimens were collected near Point Barrow, during a time when the brown lemming was exceedingly abundant.

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